

Stem cell therapy for inflammatory bowel disease

Grant Award Details

Stem cell therapy for inflammatory bowel disease

Grant Type: New Faculty Physician Scientist

Grant Number: RN3-06525

Project Objective: To test regenerative medicine approaches using human embryonic and adult stem cells in the treatment of inflammatory bowel disease (IBD). In IBD, the regeneration of damaged intestinal tissue is necessary for preventing complicated disease and for maintaining adequate nutrition. The objective is to target the epithelial components of the disease and explore the potential of using hESCs as a cell-based therapy for IBD. The underlying hypotheses for this application are: (1) hESC-derived organoids can be used to ameliorate or cure colitis, (2) enriching these organoids for committed intestinal progenitors/stem cells will improve engraftment and regeneration, and (3) expansion and activation of endogenous ISCs can improve regeneration and re-establishment of the epithelial barrier in IBD

Investigator:

Name:	Ophir Klein
Institution:	University of California, San Francisco
Type:	PI

Disease Focus: Intestinal Disease, Metabolic Disorders

Human Stem Cell Use: Adult Stem Cell, Embryonic Stem Cell

Award Value: \$3,084,000

Status: Active

Progress Reports

Reporting Period: Year 1

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Reporting Period: Year 2

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Reporting Period: Year 3

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Reporting Period: Year 5

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Grant Application Details

Application Title: Stem cell therapy for inflammatory bowel disease

Public Abstract: One of the most promising approaches that physicians foresee for treating human disease is regenerative medicine. A major aim in this field is to restore function by repairing damaged organs. Inflammatory bowel disease (IBD) is a chronic disease characterized by intermittent episodes of intestinal inflammation and disruption of the intestinal epithelial barrier. It causes significant morbidity and can lead to multiple complications, including growth impairment, intestinal failure, malnutrition, and cancer. IBD has increased in incidence and prevalence globally over the past several decades, and the increasing number of patients suffering from IBD has translated into growing health care costs. Our goal is to bring regenerative medicine approaches to the treatment of IBD by making intestinal structures called "organoids" from human embryonic stem cells. These organoids will be delivered to the intestines in order to repair damage. If the aims of the application are achieved, our findings will make a critical contribution to development of a needed therapeutic.

Statement of Benefit to California: The promise of stem cell biology lies in the ability of these remarkable cells to give rise to more differentiated cell types that can repair damaged or diseased tissues. We propose to develop translational approaches that will enable the utilization of human embryonic stem cells for therapeutic applications in inflammatory bowel disease. We anticipate that our research will be a significant step towards making the promise of regenerative medicine from stem cells a reality. Eventually, stem cell-based therapies will reduce health care costs for Californians by improving treatment for diseases for which we currently do not have effective therapies.

Our work could provide economic benefits to the state by helping to lay the groundwork for commercial efforts to repair diseased tissues using stem cells. Such developments would be of great benefit to California by making the state a leader in a field that is poised to become economically important in the future.

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